

SHORT COMMUNICATION

New data on *Theridion italiense*, with description of the unknown female

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Abstract. I describe the female and redescribe the male of *Theridion italiense* Wunderlich 1995 from live and alcohol-preserved material and provide notes on the ecology, distribution, and affiliations with the very similar *Theridion uhligi* Martin 1974 and *Theridion petraeum* L. Koch, 1872.

Keywords: Araneae, Theridiidae, Carpathian Mountains

After recent taxonomists have transferred some species to other genera (Koçak & Kemal 2008, Wunderlich 2008), genus *Theridion* contains 47 species in Europe (Platnick, 2009). About a third of these species are poorly known, ten being described only from females and four known only from males. All of the poorly-known species have been discussed only in their original descriptions, so little is known about their distribution, habitat preferences, biology, and ethology. In some cases, even the original descriptions are wanting. This article sheds light on one such poorly known species.

Theridion italiense Wunderlich 1995 was described from a single male specimen collected in Abruzzo National Park in Italy (Wunderlich 1995), and other specimens have not been recorded since. This dearth of observations is probably due to its habitat preferences: low vegetation (5 to 10 cm above ground level) in rocky areas, which makes the webs difficult to see and the spiders nearly inaccessible to collecting with an insect net. However, I have collected 30 individuals from 25 m² of proper habitat in about 2 h, demonstrating that the species may not be as rare as it has originally appeared, given its near absence from the European arachnological literature.

The first specimens from Romania were gathered by hand and sweeping with an insect net in 2007. The spiders collected in 2008 were all captured by hand. All the material was preserved in 70% ethanol. Color of the specimens is described for both live and alcohol-preserved specimens. All measurements are in millimeters. The drawings were made with a drawing tube using an I.O.R. ML-4 microscope and an I.O.R. stereomicroscope.

The specimens examined in this study are deposited in the following collections: the National Museum of Natural History “Grigore Antipa” in Bucharest (MGAB), the Zoological collection of the Faculty of Chemistry-Biology-Geography in Timisoara (CBGT), the author’s personal collection (CID), and the Thaler-Knoflach collection (CBK).

TAXONOMY

Family Theridiidae Sundevall 1833

Genus *Theridion* Walckenaer 1805

Theridion italiense Wunderlich 1995:691–695, figs. 8, 9
(Figs. 1, 2A, B, 3A, 4A, B, C, D)

Type material.—Holotype male: ITALY: Abruzzo National Park (13) collected in July 1994 (leg. Jörg Wunderlich) (in the collection of Jörg Wunderlich - CJW) – not examined.

Material examined.—ROMANIA: 1♀ Caras-Severin: Chiacotu Mic: Berzasca River Basin (44°43'52"N, 22°06'01"E) hand collecting, 1 May 2007, Ioan Duma leg. (MGAB); 1♀ Caras-Severin: Băile Herculane (44°52'00"N, 22°26'05"E) hand collecting, 10 May 2007, Ioan Duma leg. (MGAB); 4 ♀♀ Alba: Rimetea (46°27'12"N, 23°34'46"E) sweep net, 27 May 2007, Ioan Duma (CID); 25 ♀♀, 5 ♂♂ 14

May 2008, hand collecting, same location and collector (1♂, 3♀♀ in MGAB; 1♂, 1♀ in CBK; 1♂, 1♀ in IDC; 2♂♂, 20♀♀ in CBGT).

Diagnosis.—Based upon the morphology of the palp and epigynum, *Theridion italiense* closely resembles *Theridion petraeum* L. Koch 1872 and *Theridion uhligi* Martin 1974. Both male and female *T. italiense* have dimensions similar to *T. uhligi*, but are clearly smaller than *T. petraeum*. Males’ palps differ in the shape of the median apophysis (Fig. 3A–C). In females, the copulatory ducts are separate over their entire length. Using this characteristic feature, females of *T. italiense* can be easily differentiated from *T. uhligi*, whose copulatory ducts unite before opening in the center of the epigynum. The difference between female *T. italiense* and *T. petraeum* is that in the latter species the copulatory ducts open in the corners of the epigyne, not in its center.

The species also differ in their habitat preferences. *Theridion italiense* was found at low altitudes (350–1000 m) in limestone mountains. *Theridion petraeum* appears to be a species of higher altitudes and *T. uhligi* an inhabitant of grassy vegetation in the low plains.

Description.—*Male*: Dorsal carapace yellowish-brown with narrow black median band. On lateral sides of thoracic part, narrow black lines present as in *Theridion uhligi* Martin 1974, which largely disappear in some preserved specimens and thus may be hard to see. Sternum yellowish with grayish-black lateral margins. Labium brownish-red in contrast to *T. uhligi*, on which it is yellowish. Clypeus yellowish. Abdomen: dorsal part pinkish in live specimens, with median whitish-pink area bordered by a narrow brown line. In alcohol, pink disappears quickly and turns to whitish-yellow. Lateral parts of the abdomen pinkish with small white spots. Epigastric region large and brown, in contrast to that of *T. uhligi*, which is yellowish. Occasional long hairs present on abdomen. Legs: yellowish with brown annulations on femora, tibia, and tarsus. Annulations of leg segments may not be visible in some specimens. Leg lengths: leg I: femur 1.85–2, patella 0.5–0.55, tibia 1.7–1.8, metatarsus 1.65–1.8, tarsus 0.7–0.75, total leg length 6.4–6.9; leg II: femur 1.3–1.4, patella 0.5–0.55, tibia 0.85–0.92, metatarsus 1.0–1.12, tarsus 0.55–0.6, total leg length 4.2–4.6; leg III: femur 0.85–0.95, patella 0.35–0.4, tibia 0.5–0.55, metatarsus 0.7–0.75, tarsus 0.45–0.5, total leg length 2.85–3.15; leg IV: femur 1.3–1.4, patella 0.4–0.45, tibia 0.9–0.95, metatarsus 1.1–1.17, tarsus 0.5–0.57, total leg length 4.2–4.54. Tibial spines: 2:2:1:2. Chelicerae yellowish-brown without visible teeth. Basal hump on the frontal side of the chelicerae visible in lateral view (Fig. 2A). Palp (Fig. 1): Palp of *T. italiense* very similar to that of *T. uhligi* and *T. petraeum*, but rounder in ventral view and smaller than in closely related species. Shape of median apophysis (Fig. 2A) very different from that of *Theridion petraeum*, which has stickle shape (Fig. 2C). Longer than that of *Theridion uhligi*, with differently shaped base. Also, on inner face of median apophysis in *T. italiense*, characteristic protuberance present visible from slightly prolateral angle as a



Figure 1.—Ventral view of the right palp of *Theridion italiense* male. Scale = 0.1 mm.

second, smaller apex (Fig 1). Somatic features ($n = 5$): total length 2.9–3.1 mm. Prosoma 1.0–1.15 mm long and 0.9–0.97 mm wide.

Female (Fig. 3C): Carapace yellowish with black median band extending to posterior row of eyes. Median band narrower in thoracic part of prosoma than in cephalic part, narrower in younger females and widening with age. This pattern also occurs on the lateral bands. Clypeus yellowish with a black triangular spot in front of chelicerae. Labium brownish. Chelicerae yellowish. Sternum yellowish with black bands on the sides. Width of bands varies with age of female (narrower in younger specimens and wider in older ones). Abdomen: dorsally whitish medially, bordered by narrow, sinuous pinkish-brown line. Lateral parts pinkish with small white spots. Pink color disappears in specimens preserved in alcohol and becomes whitish-cream. On ventral part of the opisthosoma, directly in front of spinnerets, triangular or square shape black mark bordered by short white lines on each side. Legs: yellowish with annulations on all segments except coxae. Annulations not as well defined in young females as in older ones. Leg lengths: leg I: femur 1.55–1.9, patella 0.4–0.5, tibia 1.2–1.5, metatarsus 1.0–1.3, tarsus 0.65–0.8, total leg length 4.8–6.0; leg II: femur 1.15–1.4, patella 0.3–0.4, tibia 0.65–0.8, metatarsus 0.9–1.1, tarsus 0.55–0.7, total leg length 3.55–4.4; leg III: femur 0.7–1.0, patella 0.25–0.35, tibia 0.45–0.6, metatarsus 0.55–0.7, tarsus 0.4–0.5, total leg length 2.35–3.15; leg IV: femur 1.2–1.5, patella 0.4–0.5, tibia 0.9–1.1, metatarsus 1.0–1.2, tarsus 0.45–0.6, total leg

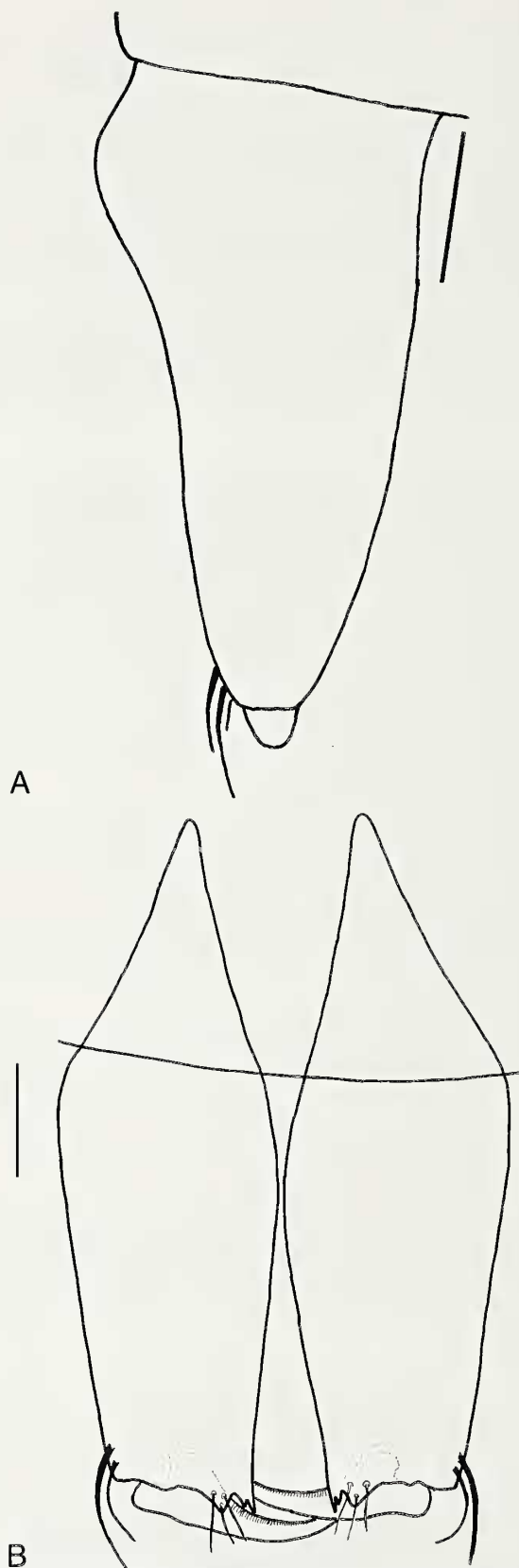


Figure 2.—Chelicerae of *Theridion italiense*. A. Lateral view of the male left chelicera; B. Frontal view of the female chelicerae. Scale = 0.1 mm.

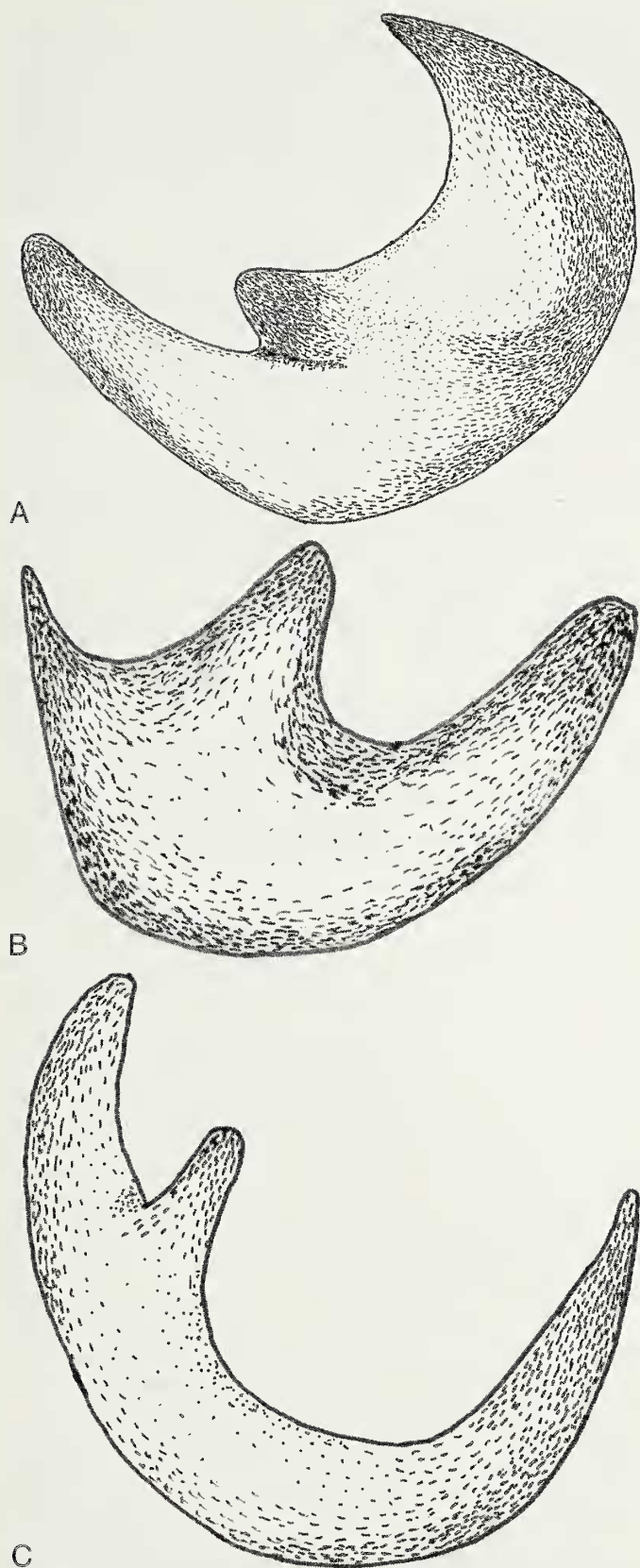


Figure 3.—Median apophyses. A. *Theridion italiense* (inner side, ectal view); B. *Theridion uhligi* (external side, mesal view); C. *Theridion petraeum* (external side, mesal view).

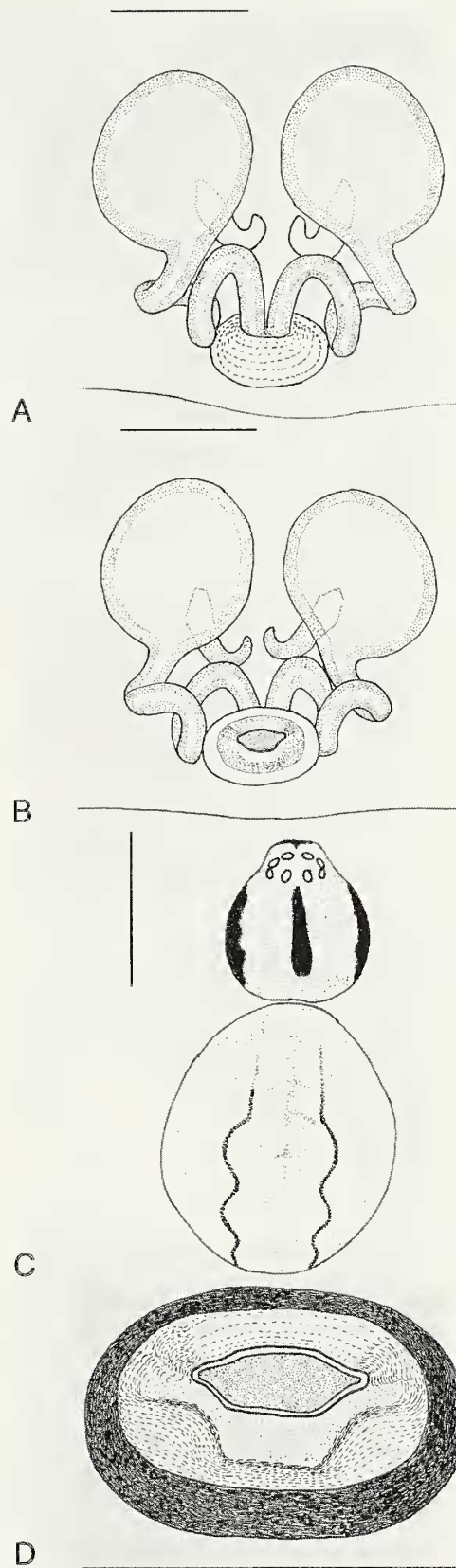
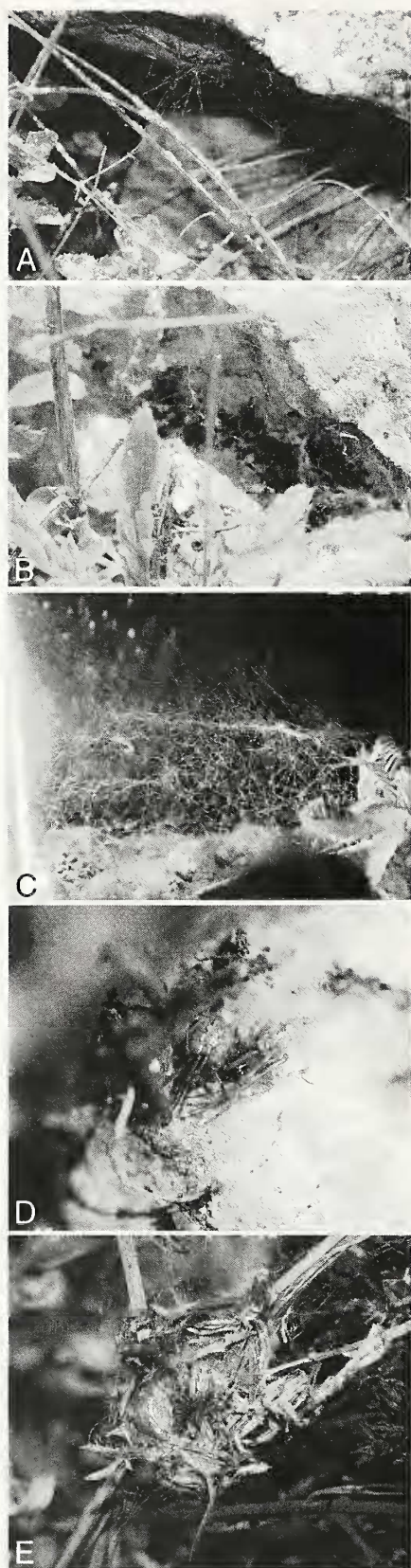


Figure 4.—Female *Theridion italiense* from Romania. A. Vulva (ventral view); B. Vulva (dorsal view); C. Habitus (dorsal view); D. Epigynum (Scale = 0.1 mm for A, B, D; 1 mm for C).



Figures 5.—Web of *Theridion italiense*. A. Frontal view of a 1-day-old web; B. Lateral view of a web; C. Frontal view of a 1-month-old web constructed in captivity in a plastic jar with a simple retreat; D. Ventral view of a simple retreat placed under a stone with the adult male and female; E. Ventral view of a retreat constructed under the branch and leaves of a small plant with the female prepared to lay its cocoon.

length 3.95–4.9. Tibial spines: 2:2:1:2. Chelicerae (Fig. 2B): two small teeth with common base on prolateral margin. Basal hump also present, but less prominent than in males. Epigynum: oval with sclerotized margins, especially the posterior one (Fig. 3D). Openings of copulatory ducts approximately in its center very close to each other. Copulatory ducts completely separate over entire length, not merging in common duct as in *T. uhligi*. Spermathecae round with thin walls. Somatic features ($n = 31$): total length 2.4–3.0 mm. Prosoma 0.9–1.2 mm long and 0.7–1.025 mm wide.

Ecological notes.—All specimens from Romania were gathered in May and were already mature. The majority of females were found with plugged epigyna, suggesting that first matings take place early in the spring. However, since the holotype male was collected in July in Italy, I infer that the species may reproduce throughout the warmer months of the year. The results of the collecting trip of 14 May 2008 suggests a female-biased adult sex ratio, in which case males mate with more than one female in their lifetimes. However the behavior of three adult males in the presence of unmated and mated females suggests that mated females do not mate with other males, similarly to other species of the *Theridion varians* group (Knoflach 1998). My preliminary observations indicate that males avoid the webs of females with plugged epigyna.

Theridion italiense appears to prefer rocky, sunny places with adequate moisture. It feeds on small insects; small ants were the most frequently observed prey.

Habitat notes.—Specimens of *Theridion italiense* from Romania were collected from low altitudes in limestone mountains (350–1000 m) at the edges of *Fagus sylvatica* forests in open, sunny areas. This type of habitat is classified as dry calcareous grassland and steppe (code 34) according to the CORINE land cover project, or as alpine and subalpine calcareous grasslands (code 6170) according to the NATURA 2000 project (Doniță et al. 2005). In this habitat *Theridion italiense* can be found in crevices of rocky walls, in small bushes, or in grassy vegetation, always close to the ground (about 10 cm above it), with the threads of the web attached to stony walls on one side, to grass on the other side, and to the ground at its base.

The web of this species is constructed very close to the ground, being well camouflaged under the branches and leaves of various plants. It reaches a height of about 5–15 cm. The spider always weaves its web under the lower branches of small woody or herbaceous plants, close to the vertical surface of a rock. In the upper part of the web, the threads are fixed to the underside of the leaves and on nearby stones. The web is typical of the cobweb weavers, being three-dimensional, irregular, and formed by densely tangled sticky and non-sticky lines. A series of gumfoot threads are attached to the ground in order to catch small terrestrial insects such as ants, small coleopterans, and even collembolans. The web looks simple at the beginning of construction (Fig. 5A, B), but becomes progressively more complex due to the new threads that spider adds over time (Fig. 5C).

Individuals occupy the upper part of the web close to the stony wall or under the leaves of various plants. Before the last molt females construct in the upper part of the web a more or less coneshaped retreat close to or under rocks, leaves or branches of small plants (Fig. 5D, E). The retreat is made of nonsticky threads, as in *Echinotherridion othum* Levi 1963, *Theridion nigroannulatum* Keyserling 1884 or *Theridion evexum* Keyserling 1884 (Eberhard et al. 2008). When shelters are constructed under leaves they are not curled as in *Theridion nigroannulatum* (Eberhard et al. 2008). The retreat is camouflaged with moss, various vegetal debris and small grains of sand. The female will stay in this shelter with an adult male (Fig. 5D) until the last molt, after which copulation takes place. Before laying the cocoon the female will enlarge this retreat so that it will be big enough to protect her and her cocoon (Fig. 5E). When disturbed, *T. italiense* will retreat into the upper part of the shelter rather than dropping onto the ground. This kind of defence is similar to that observed in *Theridion evexum* (Eberhard et al. 2008).

Distribution.—Until now, *Theridion italiense* has been found only in central Italy and in the southwestern Carpathian Mountains (Romania). The Eastern Alps and the Dinaric and Rhodope Mountains also have many karst formations and the same type of habitats as those where the species was found (Doniță & al. 2005) so I infer that the species may also occur in the mountains of the former Yugoslavia and Bulgaria as well.

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LITERATURE CITED

- Deltchev, C.D. 1992. A critical review of family Theridiidae (Araneae) in Bulgaria. *Acta Zoologica Bulgarica* 43:13–22.
- Doniță, N., M. Paucă-Comănescu, A. Popescu, S. Mihăilescu & I.A. Biriș. 2005. *Habitatele din România*. Editura Tehnică Silvică, București.
- Duma, I. 2008. *Theridion uhligi* Martin, 1974 (Araneae: Theridiidae) new to Romania. *Entomologica Romanica* 13:297–299.
- Eberhard, W.G., I. Agnarsson & H.W. Levi. 2008. Web forms and phylogeny of theridiid spiders (Araneae: Theridiidae): chaos from order. *Systematics and Biodiversity* 6:1–61.
- Jocqué, R. 1977. Contribution à la connaissance des araignées de Belgique. Description de *Theridion hublei* n. sp. *Revue Arachnologique* 1:59–63.
- Knoflach, B. 1998. Mating in *Theridion varians* Hahn and related species (Araneae: Theridiidae). *Journal of Natural History* 32:545–604.
- Platnick, N.I. 2009. The World Spider Catalog, Version 10.0. American Museum of Natural History, New York. Online at: <http://research.amnh.org/entomology/spiders/catalog/index.html>. (Accessed 7 July 2009).
- Weiss, I. & A. Petrișor. 1999. List of the spiders (Arachnida: Araneae) from Romania. *Travaux du Museum National d'Histoire Naturelle, "Grigore Antipa"* 41:79–107.
- Wunderlich, J. 2008. On extant and fossil (Eocene) European comb-footed spiders (Araneae: Theridiidae), with notes on their subfamilies, and with descriptions of new taxa. *Beiträge zur Araneologie* 5:140–469.
- Wunderlich, J. 1995. Beschreibung von drei bisher unbekannten westpaläarktischen Arten der Gattung *Theridion* Walckenaer 1805 (Arachnida: Araneae: Theridiidae). *Beiträge zur Araneologie* 4:691–695.

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